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Some Remarks on Foot-and-Mouth Disease and other Diseases in Relation to Differential Diagnosis.*

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[In view of the importance of the subject at the present time, we are glad to act upon the suggestion made by Lieut.-Col. T. D. Young at the last meeting of the Central Division that this informative contribution, which appeared in *The Veterinary Record* of June 8th, 1918, should be reproduced].

Mr. President and Gentlemen:—I propose opening the subject for this afternoon with a few remarks respecting procedure and method which are advantageously adopted when enquiring into any suspicious case of foot-and-mouth disease, whether privately for an owner, or officially for a local or the central authority.

There will not be, I am sure, any difference of opinion that the subject of foot-and-mouth disease in its relation to differential diagnosis is of the utmost importance to veterinarians. I shall endeavour to stir up your interest during the reading of the paper with the hope that those present may be able to add a share to a most instructive discussion. Nothing has given me greater pleasure while gathering together these notes on the subject, than the anticipation of extending my knowledge on a branch of our departmental work upon which I am frequently called to express an opinion. I am persuaded that busy practitioners are frequently meeting with all sorts of strange and interesting conditions affecting the common seats of foot-and-mouth disease.

It is desirable to bear in mind the possibility of foot-and-mouth disease when called upon to examine animals presenting symptoms indicating foot or mouth affections. In such cases it is good practice whenever possible to provide oneself with overall, boots and clothing—preferably of rubber composition. A pair of old boots and old clothes will be of service at short notice, or any improvised protecting garment is better than none at all. The whole should be thoroughly disinfected after use, and similar attention should be given to hat or cap, which may become soiled or contaminated by infective material during any sudden or violent movement of the animal.

Examination should never be made with gloves, except, perhaps, any kept and used for that purpose. The precaution should be taken to turn up the sleeves of the coat in order to avoid contact with saliva during handling of the parts. This safeguard in itself materially facilitates the examination, by *not* diverting the attention of the examiner from the question of actual diagnosis to the more or less unsuccessful attempts to prevent the animal soiling and contaminating the attire of the person making the examination.

It is in the appreciation of details even perhaps more in some cases than actual diagnosis that the veterinary surgeon can do so much to prevent the spread of infection from the premises by animals, persons, and things, including himself and his belongings.

On account of the marked infectivity of foot-and-mouth disease and its easy spread to other premises, every precaution is required on the part of those who are first brought into contact with the suspected animals. Naturally, the veterinary surgeon is looked up to at all times to exercise his knowledge and practical experience in a manner which will not give outsiders the opportunity of just adverse criticism or reflect discredit upon the profession.

It must be remembered that any unnecessary delay or indiscretion on our part may be the means of the disease being conveyed hundreds of miles distance in twenty-four hours. Wherever a reasonable suspicion exists, suspected disease should be notified to the local authority through the police at the earliest moment, and everything done to prevent the escape of infection by the timely change of clothing, and disinfection of hands, clothing and boots, and places, and things.

No animal should be permitted to be moved to other premises, and the general idea to bear in mind should always be to arrest movement, and if movement is necessary, under veterinary advice and supervision, the movement would almost invariably be inwards and never outwards.

Inquisitive neighbours and other persons must be kept outside. One farm hand should be allotted to the sick animal, and he should not leave the isolation box or premises without a thorough disinfection each time after entry thereon. A bucket of disinfectant should be arranged for, placed at the entrance of isolation premises or buildings, and renewed as required. Everything used about the suspected animal should be cleansed and disinfected after use, including the thermometer, before removal from the premises.

One is well repaid by any extra trouble taken at the earliest stage of enquiry; not always financially, but in that higher sense of professional duty, should disease appear elsewhere; and perhaps still more so, should it *not* appear on other premises.

Every such common-sense precaution is a safeguard in the interest of stock-owners generally, and clients in particular.

It is important to draw a strong line of distinction between personal desires or individual hardships of particular owners, and the correct professional attitude

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towards the disease under consideration. The question is a wide one, and decisions must be arrived at in the interest of the community.

From time to time, instances of professional inattention and thoughtlessness are encountered, whereas a little forethought could have prevented such omissions occurring. At the time, they give rise to much comment and all sorts of hard statements.

Method in Examination.

In order to place oneself in the most favourable position to arrive at an accurate and prompt diagnosis, it is advisable to make a more or less routine examination. A good deal depends upon the method employed. It instils confidence to the examiner himself as well as to others, and leads to accuracy in diagnosis and reliability of opinion.

It is never a waste of time to watch the animal before disturbing it, in order to note the general behaviour of the animal, and in particular, to listen for sounds of the mouth, as "smacking of the lips" and to detect unusual movements of the limbs, as "striking out of the foot"; to observe how food (if any) is taken into the mouth, and whether it is masticated, swallowed, or "quidded," also to note the presence of salivation, and whether it is frothy or ropy in character. Inspection of the trough and ground area where the animal has been standing since illness commenced should be made, for evidence of salivation, etc.

This interval is also an opportunity to pursue a quiet conversation with the owner or herdsman with regard to the history, manner, and symptoms exhibited since sickness was observed. The temperature, pulse and respirations will also be recorded before disturbing the animal.

The animal is then made to move and the character of its movements noted.

To proceed with the closer examination of the animal:

1. Examine the mammary gland and each teat, noting any lesions thereon.

2. Pass the hand down each leg, and note whether there is any resentment to gentle pressure around the coronets or at the back of the heels.

3. Examine the head and mouth in a good light, with the head firmly held in a proper position. Whenever possible the examiner's hands should be kept free for handling the parts to be examined, and not for restraining the movements of the animal.

(*a*) Examine the nostrils and muzzle for swellings and definite lesions. (*b*) Under surface of upper lip, and dental pad. (*c*) Under surface of lower lip and gums. (*d*) Inside cheeks. (*e*) Under surface of tongue. (*f*) Hard palate and pharyngeal region. (*g*) The tongue. First, take a general view of it, noting any abnormalities on the surface, along the edges, or at the tip. Turn the tip upwards, examine the lower surface and the fraenum.

It will usually be found advisable to withdraw the tongue, unless the lesions are very definite and typical. A good deal of resistance is offered at times, especially by individual animals, when the tongue is the seat of lesions, and foot-and-mouth lesions in particular. The withdrawal of the tongue by the hand can be facilitated with the aid of an old woollen glove or piece of towelling, which prevents the tongue slipping through the fingers. In this way a good view can be obtained of the posterior upper surface of the tongue, and the free hand can be passed along the surface.

Special attention must be directed towards the anterior end of the tongue which is usually covered from view by the hand gripping that part. This can be done by taking a second grip behind the first one with the other hand before releasing the first hold, with or without the aid of the cloth, as the case may be. The anterior end will now be fully exposed to view and can be manipulated with a free hand. If there is any mucus or "coating" on the tongue or hard palate it should be removed by washing the parts with the hand, or wiping with a wet rag until a cleansed surface is obtained.

To complete the examination, each foot should be examined, after having been washed to remove any dirt adhering or caked over the surface. Particular attention should be directed towards the heels for lesions, and separation at the junction of horn with the skin, around the coronary band. Examination should also be extended to the interdigital space for the presence of lesions, intact or ruptured.

When suspected animals are at pasture, away from buildings, it may be necessary to erect an improvised enclosure in order to get the animals together, and secured for a proper examination. It is not good practice to chase round fields after animals, with the risk of their breaking through hedges and fences. A good gate will make one side of the enclosure, although better not erected at that spot if the gate adjoins a public road; when that is the case the gate should be hurdled off on the inside to prevent access of the animals. A few hurdles firmly bound together against a tree with additional hurdles fixed on end to prevent animals climbing over, will meet some cases, or it may be necessary to resort to the use of stronger posts and rails.

The two conditions which are usually found indispensable in making an examination of animals suspected of foot-and-mouth disease are that the head is held in the proper position, and that the light is good. Whenever possible, the final examination, at any rate, should be made in daylight, especially when there is only one animal affected.

The best advice is, never be hurried—take time—at the same time there is no need to delay anything or to keep back for further observation a typical or very suspicious case of foot-and-mouth disease among a number of animals; such action is quite unnecessary and cannot be commended.

Cases may arise in practice in which the symptoms and lesions present do not support a strong suspicion of foot-and-mouth disease and yet may leave the veterinary surgeon dissatisfied or desirous of another opinion. Arrangements can be made for one of the

Board's veterinary inspectors to visit the premises in consultation with the local veterinary surgeon, on application to the Board of Agriculture.

The request that a veterinary inspector might consult with a veterinary surgeon on a case of stomatitis or other suspected lesions in animals, met with in his practice, should be addressed to "Secretary," Board of Agriculture and Fisheries, 4 Whitehall Place, London, S.W. 1 (Teleg. Address: Agrigi, Westrand, London).

Another point I would like to touch upon is the necessity to recognise the nature and character of the lesions present. It will be found of great assistance to possess a clear knowledge and mental vision of the normal appearances of the organs concerned and such conditions as hyperæmia, congestion, and inflammation, which may be definite or merged into one another. These conditions may be diffused or in local patches. Regarding more advanced and significant lesions, we meet with the papule or small swollen nodule, the vesicle, a small sac, bleb, or simple blister, containing clear, straw-coloured or slightly blood-tinged serum; the pustule, usually a small nodular swelling or boil containing purulent matter. Lesions may consist of minute capillary extravasations of blood in the form of petechial or hæmorrhagic spots, or larger extravasations of blood.

Most lesions vary in size from about a pin's head to a crown piece. Usually the larger lesions are due to coalescence of smaller ones.

Further, we meet with single or multiple, open, ulcerated, or suppurating wounds, sores, or erosions involving small centres or larger areas of tissue. It is necessary to consider whether these conditions are the later stages of ruptured isolated lesions or that the loss of epithelium is due to causes acting from without, including cuts and wounds or small areas denuded of epithelium on the tongue, cheeks, and lips, denoting tooth marks.

In addition to the lesions and conditions mentioned, there are those of a more or less definite catarrhal, œdematous, croupous, diphtheritic, fungoid, necrotic, fibrous, warty, or neoplasmic nature.

The question which not infrequently arises in one's mind when viewing lesions which cannot be considered typical of foot-and-mouth disease is whether the lesion is an atypical one, or whether it indicates that a previous typical lesion was probably present. Finally, there are healing and healed lesions to be considered with regard to their relative importance.

In my judgment, this sort of mental review is frequently necessary if the case is to be dealt with in a professional manner, and for the examiner to get the best out of himself.

Various Pathological Conditions.

I propose to bring before your notice a number of pathological conditions affecting the buccal or oral cavity, including the muzzle; also the feet and the teats.

You may perhaps question the inclusion of some of them as unlikely to be confused with foot-and-mouth disease, but they are included because they have been encountered in connection with cases of suspected foot-and-mouth disease.

In the first place I would refer to a condition which from time to time is a subject of enquiry. I have only met with it in the case of fresh calvers. The cause of the alarm is due to excessive salivation, and the suggestion of acute lameness is due to paddling movements of the feet and general restlessness of the animal. Red spots on the tongue have been reported to be present but I have never seen any lesion, and with one or two exceptions the symptoms have subsided by the time of examination. The condition appears to be closely related to parturition.

Next in order of less importance from a differential diagnostic point of view, is the presence of foreign bodies, injuries, dental troubles, tumours, abscesses, and cases of choking, which may exhibit certain suggestive symptoms, but which should occasion no difficulty to an accurate diagnosis on examination.

There are also those cases of excessive salivation combined with general inflammatory changes to the buccal membrances due to chemical irritants arising from the use of insufficiently diluted therapeutic agents, in the form of drinks and electuaries, or from the prehension of skin dressings or other poisonous substances taken in with the food, or otherwise. Advanced cases of husk may also give rise to suspicions, from time to time, on account of the deceptive symptoms exhibited.

I am quite unable to account for many of these strange cases, and shall be glad to learn from members present their experience with regard to these agents—chemical, thermal, mechanical, or traumatic—which produce injury and pathological changes to the mucous membrane of the mouth.

Among the causal agents mentioned by Huytra and Marek (Special Pathology of the Domesticated Animals), and Friedberger and Fröhner (Veterinary Pathology), are the licked-up hairs or the bearded grains of barley, scalding food stuffs, chemical irritants, and the continuance of certain medicines internally, as mercury, iodine, and lead; fermenting foodstuffs, and vegetable poisons, as spurge, the hemlocks, mustard, ranunculus, and even insufficiently made hay; also the uromyces, the fungi which live on Swedish clover.

Other poisonous plants, containing chemical contents, are aconite, hellebore, daphne, colchicum, corn poppies, tobacco, corn cockle, foxglove, yew, rhododendron, etc.

Further causes of stomatitis given by these authors are the ingestion of fodder infected by blight fungi (*uredineæ pyrenomycetes*), the rape destroyer (*polydesmus exitiosus*), the common grass (*puccinea graminis*), and corn blight (*puccinea arundinacea*).

Among the rusts, bunt (*tilletia caries*).

The hairs of caterpillars are said to be a special cause of stomatitis.

Beside the mechanical irritation there is probably the presence of formic acid. Plant lice (aphis) are also stated to be the cause of lesions within the mouth.

To these agents may be added the bites and stings of insects.

I make use of the term "Stomatitis" in an accommodating and general way, to include many affections of the mouth—the nosological termination "itis" denoting the usual inflammation.

Stomatitis may be primary or idiopathic, and secondary when it appears in the course of systemic diseases.

The following list covers the number of diseases and abnormal conditions of the muzzle and buccal cavity that I desire to bring before your notice, and if time permits, a few remarks in connection with lesions on the teats and feet will be added.

1. Catarrhal stomatitis.
2. Petechial stomatitis.
3. Papular stomatitis.
4. Foot-and-mouth disease.
5. Vesicular stomatitis.
6. Pustular stomatitis.
7. Ulcerative stomatitis.
8. Necrosing stomatitis.
9. Necrotic ulcers on tongue.
10. Mycotic stomatitis or "dirty tongue" disease.
11. Pseudo-membranous stomatitis of sucklings.
12. Spreading sores of lips.
13. Ranula or frog tongue.
14. Actinomycotic stomatitis.
15. Pustular dermatitis.

Catarrhal stomatitis. As the term indicates, it is an inflammatory condition of the mucous membrane of the mouth. In extent, it may be diffused or localised and there is present more or less mucus on the surface. Frequently met with in one animal. A condition of hyperæmia, congestion or inflammation may be diffused over the greater part of the buccal membranes or arranged in patches in one or more situations. The principal seats appear to be in the order—hard palate, cheeks, lips, and tongue.

The hyperæmic condition is often confined to the hard palate and cheeks, and generally in quite small spots or areas. The congested patches are more marked and larger in extent, whereas the actual inflammatory parts are recognised by the presence of the usual changes, *e.g.*, heat, redness, swelling, and œdema; also varying degrees of pain are expressed by the animal.

Spherical linear markings, red in colour, may be present, chiefly on the hard palate, varying in size from a sixpence to a shilling-piece, or even larger. The coloured outline suggests local injection of capillary vessels and is well depicted on the surrounding paler normal tissue. In cases of this description the appearance mentioned may be quite masked from view by the accumulation of tenacious mucus, which will require removal before the examination can be completed.

Hyperæmic, congested, or inflammatory lesions are not unusual in young suckling calves about the dental pad and the mucous membrane of the upper lip. Less frequently, similar lesions are present in the lower jaw in front of or behind the incisor teeth. It is quite possible to meet with these simple, and I might add, almost insignificant conditions in young calves which have died rather suddenly from an acute febrile attack of foot-and-mouth disease. In fact, so serious and important a disease may never be thought of, let alone suspected, until other animals are examined, or typical lesions of the disease appear at a later date. In any mysterious death among calves showing definite hyperæmic or congested lesions on the buccal membranes, an examination of the feet should be made, together with a general enquiry into the health of other contact and susceptible stock on the premises.

A chronic catarrhal condition may exist, more especially in animals which have not been thriving for some time. In these cases the mouth is in a very "furred" and unhealthy condition, and the entire membranes may be covered with a thick coating of mucus, food particles and epithelial casts. After removal of this covering, the mucous membrane presents a dull unhealthy-looking appearance. At times no actual or definite lesions may be revealed, whereas at other times small hyperæmic, congested or inflammatory lesions on the lips, gums, hard palate and tongue may be present. The tongue, more particularly along the edge, may show slight or more marked ulcerative lesions.

A foul catarrhal affection of the mouth is not an infrequent indication of digestive trouble or specific disease, as tuberculosis, when the lesions themselves may be tuberculous in origin.

Petechial Stomatitis. A condition seen in young stock about six months to twelve months old, indicated by the presence of small petechial spots disseminated over the mucous membrane of the buccal cavity, including the tongue. Usually only moderate in number, sometimes more numerous. Apparently the condition does not give rise to any disturbance of health, although some may be dull and listless. The condition is generally discovered as the result of "mouthing" contact animals to an animal showing some more definite symptoms of mouth affection. Quite possibly the animal upon which suspicion of foot-and-mouth disease was cast had at some previous stage shown this simple condition, which of itself, under ordinary circumstances, would probably fail to excite attention.

Papular Stomatitis. A condition indicated by the presence of numerous nodules or papules, small hard elevations firmly set in the tissues affected. Often seen at the angles of the mouth and along the line of junction with the skin of the lips, inside the cheeks; less frequently on the tongue. When the tongue is affected they may be found on the under surface of the free end. Frequently they are formed in the skin of the muzzle firmly adherent to the under structures. Multiple papules coalesce and form larger areas, and the surface may be red, sore and inflamed.

The initial inflammatory nodule is surrounded by a reddened base. The nodules are hard and resistant on manipulation. A drop of blood or serum may escape from the surface on digital pressure being applied to the nodule. After the formation of the

nodule the epithelial covering desquamates, exposes an unhealthy red spot or surface—sometimes crustation on the skin takes place. The centre of the lesion is depressed and the edges are hard and thickened. After resolution of the parts the previous site of the nodule can be located for some weeks by the new cicatricial tissue. Many of the nodules do not develop beyond the papule stage; they decrease in size and prominence, and "die down." Subsequently the epithelial surface can be easily picked up or rubbed off.

The condition affects a number of animals, and is regarded as infectious. The general health of the animal is not appreciably interfered with, although individual animals do not do well for a time, and may lose flesh.

Foot-and-Mouth Disease. According to Fleming's Manual of Veterinary Science and Police, published in 1875:—"The diagnosis of this malady is very easy and it is almost impossible to mistake it for any other disease." In these days, however, things may not always be so easy, as we cannot afford to wait until a number of animals have fallen with the malady. Instead of dealing with a typical outbreak we may be confronted with a single animal, and the lesions present may not provide the classical description of the disease.

You will bear with me when I remind you to beware against bringing—and quite inadvertently it may be—a text-book description of a typical case of disease to the defence of our diagnosis when the actual facts before us do not support our opinions. The method may, on the other hand, be applied to establish, adjust or correct our opinions before we express them. This is just a note by the way.

Foot-and-mouth disease is in part a vesicular stomatitis, but the vesicles are not confined to the mouth; they are also usually present on the teats and the feet. Hence the old name "foot-and-mouth disease" will be retained as the more expressive title for the disease, and also in distinction to other forms of vesicular stomatitis which are not characterised by the presence of infectivity, febrile symptoms, systemic disturbance, lameness, and the presence of lesions on the teats or feet.

In foot-and-mouth disease true vesicles are present, *i.e.*, just blebs or small bladders containing fluid. They are situated on any portion of the tongue, usually upper surface and anterior third. The unruptured lesions often stand out prominently and are well-defined and vary in size from a pin's head to a small hen's egg. The mucous membrane over the lesion is at first unaltered in appearance, often decidedly pink or occasionally quite red in colour, and later is seen as a yellow or dirty-brown necrosed piece of tissue. The saculated membrane forming the vesicle and holding the contents, can be picked up between the fingers, causing rupture of the vesicle and escape of the contents. If quite recently formed, the membrane may offer some slight resistnce on manipulation, but very soon the over-lying membrane becomes necrosed, is yellowish in appearance, and can be easily ruptured—if it is not, as is more often the case, already broken.

When lesions are present, the animal usually resents any handling of the parts affected. The size of the lesions varies, usually from a pea to a five-shilling piece, or it may be so large as to involve the lower third or fourth of the tongue. Lesions which become ruptured soon after formation expose a bright red base. The mucous membrane is free and ragged round the edges of the lesion. The tongue is usually not appreciably swollen or tumefied, and generally "clean" in appearance.

There is no suppuration present in an uncomplicated case of foot-and-mouth disease. The lips are often "puffy" or swollen, and the lesions may be present anywhere, usually the most frequent and typical seat is under the upper lip, laterally situated near the junction of the skin, extending towards the dental pad. Small but similar lesions may be seen, but less frequently, on the membrane of the cheeks and hard palate. Vesicles are present at times, and often of considerable size, on the muzzle and inside the nostrils.

In sheep, the dental pad is the commonest seat of lesion. There is no marked accumulation of serum under it, but the whole surface becomes separated from the underlying tissues and can be pushed off or removed with the finger into the hand. Other vesicles in the mouth, notably upper and lower lip, may be present, but less frequently, and usually very small in size.

In pigs, the snout and inside of nostrils are the commoner seats affected in connection with the mouth, although small vesicles are met with elsewhere, sparing in number and scanty in exudate.

Of course the entire clinical picture exhibited by the animal or animals, taken in conjunction with the lesions, is of the utmost importance and assistance to a differential and accurate diagnosis. Constitutional disturbance and falling off in condition is most striking in some cases, especially milch cows, while in other cases it is not nearly so well marked.

Inappetence or quidding of food is commonly present. Salivation is most marked and constant at the onset of disease. It is at first frothy and later ropy in character, depending on size and stage of lesions.

"Smacking of the lips" is invariably present during the early stages of the disease when the lesions are extensive, or single unruptured lesions of large size exist on the tongue; also, after they have burst or been ruptured, until the raw red base has become covered with a firm coagulum of lymph.

Lesions on the teats fairly constant.

Lesions on the feet usual, but their presence not necessarily essential. Lameness is acute and well-marked until the foot lesions have ruptured. The affected animal is restless and uneasy on its feet when standing. Snatching up, shaking, and striking out with the affected foot—as if to free some foreign body lodged between the claws—is a constant symptom of lesions in the feet.

The internal temperature rises several degrees until after the formation of the vesicles, when it usually falls to near normal.

In sheep or in pigs salivation is not very appreciable, but lesions affecting more than one foot, together with acute lameness, are strikingly marked in both these animals.

Before passing on to the next condition affecting the mouth, I would offer you a word of advice. Do not let the exceptional animal deceive you, for in practice you will perhaps one day find to your surprise an animal walking apparently sound with lesions in all four feet, and an animal enjoying a mouthful of hay with a huge lesion in the mouth, or an animal with a temperature of 108 degrees or more revealing no indications of ill-health, or a young animal dead from the virus of foot-and-mouth disease, showing no lesions. Occasionally an animal may show but a single lesion in a solitary situation; or several animals affected with a mild form of the disease may show very small or slight lesions or disturbance in health and condition.

These are some of the lessons learnt in the field, indicating the necessity for every precaution, and taking nothing for granted; and that the iodiosyncrasies among animals cannot be answered by logic.

Next to the possibility of being misled by the behaviour of the animal, is the certainty of being misled, from time to time, by owners or attendants, for they will tell you that lameness is soundness, that salivation is desiccation, that inappetence is gluttony, and so on. Hence the necessity to see and handle everything for ourselves if we accept the responsibility of the opinion we are asked to give.

Vesicular Stomatitis. After what has been said with regard to the vesicular nature of the lesions of foot-and-mouth disease, it is needless to say that any lesion of a vesicular character within the buccal cavity, or at other seats of foot-and-mouth lesions, must be regarded with suspicion and cannot be dispensed with until further observations have been made.

Vesicles may appear as primary lesions or be preceded by the papule stage, when they are usually recognisable as such. They may also be succeeded by the ulcerative stage.

There is often present more or less catarrh of the buccal mucosa.

The vesicles may be isolated, or multiple and in patches. They vary in size from a pin's head to half-a-crown or more; they are spherical or lenticular in shape, and may be situated on any part of the mucous membranes.

When the vesicles rupture, a little clear serum escapes, and a dark red or a reddish-brown base is exposed. They may rapidly heal, or may pass into the ulcerative stage, when they appear as small ulcers or erosions on the mucous membrane.

Fungi, moulds, plants or weeds in forage, hairs of caterpillars, etc., have been looked upon with suspicion as the cause of these lesions, but nothing has been definitely proven.

My personal experience in meeting with this form of stomatitis has not been wide. The commoner condition met with has been the presence of small spherical vesicles or pimples along the edges and under surface of tongue. Larger isolated open lesions have been met with on the tongue, having quite a crater-like appearance. They are generally confined to the anterior third of the tongue, and the tip is not infrequently involved, where the open lesion is often horse-shoe shaped. In these particular cases one animal only was affected, the lesions were single, and there were no feet lesions.

More extensive, but somewhat similar, lesions have been met with by my colleagues, when several animals were affected on the same premises, and the lesions were sometimes two or more in number. In some instances what was considered to be a papule or nodular swelling appeared at the tip of the tongue, and on the surface of the papule a small vesicle developed, varying in size up to a bean, or even larger. The vesication, not infrequently, extended to the under surface of the tongue and burst at this point of least resistance. Similar lesions were also met with in a few cases on the border of the lips.

Lesions were also encountered at other situations, but more commonly the anterior third of the tongue; they varied in size from a sixpence to a crown piece. The lesions are usually tough and require a good deal of pressure to bring about a rupture of the membrane. When squeezed between the fingers, a small punctured hole is made at the summit of the lesion, through which aperture a fine jet of a few drops of fluid can be forced.

The unruptured lesion is more firmly set in the tissues. The rupture is small and near the centre, and the over-lying membrane is not easily torn away, whereas in foot-and-mouth disease it is more general, usually around the periphery of the lesion; and the overlaying membrane rapidly breaks down and is easily removed.

I have also received no suggestion that the primary vesicular lesion arises beneath the corium, but I cannot speak definitely on this point at the present time. If such is the case, the open lesion would be deeper, and the loss in tissue replaced by actual scar tissue—the papillæ having been destroyed.

There was not observed at the time of examination any appreciable systemic disturbance or rise in temperature, and in no instance was any lesion of a vesicular nature met with in the feet. There may be present a good deal of salivation and some evidence of uneasiness in the mouth.

Hutyra and Marek divide aphthous-like diseases, *i.e.*, those showing vesicles, into two groups. The first group is characterised by the presence of vesicles on the buccal mucosa or muzzle. The principal seats are the hard palate and gums, more rarely the sides and the tip of the tongue, lips, and cheeks. The presence of the vesicle is indicated by a greyish-white or greyish-brown deposit (pseudomembranous) on a reddened surface or in other cases round intensely red erosions.

The second group is characterised by the simultaneous affection of the buccal membranes, of the integument of the muzzle, of the integument of the extremities, and of the udder. There are a rise of temperature, the usual febrile symptoms, profuse salivation and smacking sounds of the mouth as in foot-and-mouth disease. The mucosa of the mouth is intensely reddened, and covered with corrugated, diffuse, pseudomembraneous deposits, especially the hard palate, the gums, and the inner surface of the lips. Lenticular yellowish-red or greyish nodules, or crusts with a central depression appear on the muzzle, and exceptionally on the nasal mucosa. There is a *dermatitis* of the lower extremities as seen in clover disease ; also on the skin of the udder nodules the size of a lentil, with several vesicles and subsequent crust formation, have been seen.

The differential diagnosis is determined in foot-and-mouth disease by the appearance of vesicles on the feet and buccal membrane, including the back of the tongue, and the absence of pseudomembranes. Apart from foot-and-mouth disease, the contagious nature is usually absent, and also the vesicular lesions on the feet and udder.

I am afraid the attempt to elucidate the clinical picture of cases of vesicular stomatitis has occupied a good deal of time, and that the description may have left much to be desired. However, I trust it has not failed in fixing the importance of treating all cases of vesicular stomatitis with due suspicion, and close observation as to the exact nature and extent of the lesions.

Pustular Stomatitis. Pustular stomatitis is indicated by the presence of multiple inflammatory nodules on the buccal mucosa. The nodules rupture and suppurate. Definite ulcers are formed, or, as is more often the case, due to the coalescence of multiple lesions, larger ulcerated, granulating, and hæmorrhagic areas are formed.

As a contagious disease the affection is, I believe, more especially an equine one. A contagious form of pustular *dermatitis* is commoner in young cattle and sheep.

I have only seen two or three cases of pustular stomatitis in young cattle. The animals showed a portion or the whole of the upper lip tumefied with suppurating lesions on the mucous surface. A similar lesion was met with on the outside of the lip. The nodules varied in size from a split pea to a sixpence. Exudations, matting of adjacent hair, and crustation over the affected parts were present.

Ulcerative Stomatitis. The ulcerative condition may follow on as a result of the papular, vesicular, or pustular lesions, or in association with general unthriftiness, or to other specific diseases. It is a condition frequently seen in connection with a chronic catarrh of the buccal cavity.

The chief seats met with affected were the edges of the free portion of the tongue, extending to the under surface, also small ulcers or larger ulcerated patches on the buccal membrane adjacent to the molar teeth, dental pad, hard palate, and around the gums, particularly inside the incisor teeth.

The ulcer is frequently preceded by a superficial necrosis of a piece of mucous membrane from the size of a mere spot to quite a large patch, or it may increase slowly in size by erosion. The lesion has a punched out appearance, and the floor of the ulcer is usually red and hæmorrhagic, and even granulating. At other times it is more indolent in character. With the former condition there may be an appreciable amount of discomfort to the animal, and excessive salivation present.

As might be expected when an animal has a history of unthriftness, it is not at all uncommon to find a dermatitis of the skin in the region of the fetlocks and coronets, and also small wounds, abrasions, or erosions around about the heels, but I have not met with anything typical of genuine foot-and-mouth disease. Foot soreness may be present, or lameness due to foul in the foot, foot rot, or injury to the foot or fetlock.

Ulcers and erosions of the buccal mucosa, varying in size, are common lesions in the course of such diseases as rinderpest, malignant catarrh, and calf diphtheria, following the desquamation of the epithelial croupous casts or pseudomembranes.

Necrosing Stomatitis. In this condition multiple small necrotic nodules are present on the muzzle and lips, and in a lesser degree on the mucous membrane of the lips. The lesions are prominent and hard, black or dark in colour, about the size of a pea to a threepenny piece, and suggestive in appearance of a small " sitfast." In the course of time separation takes place between the diseased and healthy tissues, and the necrosed nodules become detached, being rubbed off by the animal ; or the centres fall out of place, leaving round holes or depressions in the skin, which heal up under favourable conditions.

Other lesions may be felt as nodules—hard and shot-like—in the mucous membrane, immediately beneath the surface, which in some instances appear unbroken to the naked eye. In those cases in which the necrotic centres had sloughed out small circular holes or cavities were seen in the mucous membrane of the lips, around the dental pad, and on the pad itself. There were usually not more than one or two such lesions in the same animal at the time of examination.

This condition has also been met with in connection with cases of so-called " dirty tongue " disease.

Necrotic ulcers in tongue and buccal membrane. In this condition there are well-defined single, or occasionally more, concentric areas of necrosis in the tongue or cheeks, varying in size from a shilling to a florin piece. The necrosed areas are well-defined from the surrounding healthy tissue, and are yellow or brown in colour. In course of time separation of the necrosed portion takes place, the dead tissues slough away, leaving correspondingly large, single, or more, holes or cavities in the substance of the tongue. There are no loose edges of epithelium. The epithelium forming a boundary zone to these lesions is closely bound down to the underlying tissues.

The cavity is almost a quarter of an inch or more deep. There is no hæmorrhage or inflammation of the parts, the open lesion takes on the general characters of an indolent ulcer as met with in cases of swine fever. The lesions on the cheeks were near the angle of the mouth.

Mycotic Stomatitis or "Dirty Tongue" Disease. I am not at all sure of the nomenclature of this condition. If not strictly accurate, it is at least a suggestive description of the condition met with.

In this affection there is a deposit or deposits on the surface of the tongue which can be readily seen as small yellow or brownish spots, slightly raised from the surrounding parts. The lesion increases in size around the circumference in a ring-like manner. The centre and older portion of the lesions assumes a darker colour, peels off or drops out, leaving a well-defined, clear, white central area.

When several lesions are present, they become confluent. The general condition of an advanced case arrests thoughtful attention from its striking and deceptive appearance, which is due to the clear, white central area in contrast with the discoloured peripheral zones. In this condition there is some resemblance to the general appearance of a tongue showing healing or, more particularly, healed lesions of foot-and-mouth disease.

However, when once the condition is recognised, it is easily differentiated by the absence of vesicles, and the presence of the dirty deposit which gives to the disease the descriptive local title of "dirty tongue."

With the exception of the superficial horny layer of epithelium, there is no rupture or loss of mucous membrane. The horny layer, if not interfered with, desquamates into the mouth, or it can be peeled off with the fingers in flake-like fragments or patches of considerable size. During the process the papillæ of the tongue can be seen receding from the horny layer, leaving a finely-perforated, detached piece of dirty-looking dried, horny membrane within the grasp of the fingers. If this brittle thin piece of membrane is held up to the light the perforation can be easily detected, suggesting in appearance a piece of incandescent mantle or perforated zinc.

A similar very superficial and less distinct lesion is usually present on the mucous membrane of the lips—the upper lip in particular. The extension of the labial lesion is usually very rapid, and it loses itself at the junction of the mucous membrane and skin proper. A dirty, yellowish-brown line of remaining tissue-like membrane marks the boundary of the lesion, under which the finger nail may be inserted. There is no appreciable broken surface, but usually the whole area is temporarily somewhat more highly coloured pinkish-red than normally, following the flaky exfoliation.

The general appearance of the affected parts may at first sight suggest a certain stage in the lesions of foot-and-mouth disease. Closer examination will usually disclose the deception and reveal the true character of the lesion.

In pronounced cases salivation is present, and the general behaviour of the animal arrests attention, but it is not uncommon to find, on examination of unsuspected contact animals at grass, evidence of the diseased condition of the tongue and lips. There are no lesions on the feet and no lameness present.

Pseudomembraneous Stomatitis of Sucklings. I have only seen this condition in lambs, although it may exist in calves.

The buccal mucosa becomes affected in small areas which merge into each other until quite large patches are involved. The lesions are situated on the lips, gums, angles of mouth. The first lesion often appears in front of the first two incisors in the form of a raised congested spot, which becomes swollen, intensely red, inflamed and œdematous. The lesions break down, and bleed readily on manipulation. The milk teeth often fall out prematurely, *i.e.*, directly, as a result of the disease.

There are also present on the intact lesions, pseudo-membraneous deposits of a cheesy or diphtheritic nature. These slough off, leaving a raw angry-looking hæmorrhagic surface. They may be present also on the tongue, usually on the side adjacent to a lesion on the lips or angle of the mouth.

The lambs are very ill, look very dejected, and are unable to suck if they desire to. A large number succumb to the disease. I have not seen any lameness or foot lesions associated with the disease, and I have not observed any similar condition amongst the ewes.

I might add, however, that one or two practitioners have drawn my attention to the fact that a very similar, if not the same, condition of a contagious nature, affecting the external genitals, existed in a large proportion of the ewes of the flock during the previous late summer or early autumn. It was considered that the infection might possibly have been conveyed to the fœtus during gestation. An apparently arrested and mild form of the genital affection has also been noted in a number of the ewe lambs at the time of docking.

Under this heading I would make a passing reference to diphtheria in calves, characterised by a diphtheritic inflammation of the buccal mucosa. The symptoms and general appearances during life are very suggestive of foot-and-mouth disease until a closer examination is made.

Spreading Sores of the Lips. A benign condition, seen on several occasions in young cattle, affecting the mucous membrane of the upper lip. It appears as a superficial circumscribed sore which extends slowly around the periphery. It is very red in colour and bleeds slightly on manipulation. It does not appear to give rise to any disturbance to the general health of the animal.

Ranula, or Frog Tongue and Tooth Marks. A condition indicated by the formation of a large, painful, œdematous, intensely-reddened swelling under the tongue, with more or less corresponding swelling of the submaxillary gland. It is generally regarded as due to an obstruction of the ducts to the sublingual gland, set up by the penetration of foreign

bodies taken in with the food. Pus may be seen escaping through Wharton's duct, or abscess formation may take place. Profuse salivation is present, and the animal is distressed and unable to eat.

Attention is drawn to the presence of tooth marks on the tongue, cheeks, and upper lip. The situation will be invariably opposite the offending tooth, and usually recognised as due to the teeth. Those upon the cheeks and lips are more distinctly cuts, especially the latter. The usual tooth mark on the side of the dorsum of the tongue is in the form of small round or oval lesions with thickened borders and denuded of epithelium, showing a depressed brownish base. The peripheral epithelium is usually intact. Occasionally a deep clean cut wound inflicted by the incisor teeth will be found on the free end of the tongue.

Actinomycotic Stomatitis. In this disease the buccal membranes are frequently the seat of lesions, particularly the tongue. In the first instance, small hard yellowish nodules can be detected under the mucous membrane with an accompanying induration of the tongue. The tongue becomes enlarged and hard, protruding from the mouth, hence the common name " wooden tongue."

There may also exist the characteristic actinomycotic ulcer within the so-called " food cavity " of the tongue, which is situated directly in front of the dorsal prominence. The cavity is frequently plugged with foodstuffs, hairs, etc., the actual lesion being covered from view. When forcibly removed the whole appears as an offensively smelling mass of decomposing foodstuffs, mixed with purulent matter. There is evidence of loss of tissue and thickened tissue in the ulcer, also small sinuses can be traced into the substance of the tongue.

Ulceration of the mucous membrane over the more superficial nodules takes place which can be seen as reddish, ulcerating sores or granulating wounds on the tongue. The parts are quite firm and hard to the touch. There are no characteristic loose edges of epithelium as seen in foot-and-mouth disease.

Similar lesions may be present on the hard palate. I would be very glad to receive from members any information with regard to lesions on the hard palate in this disease or any other affection of mouth.

Pustular Dermatitis in Cattle and Sheep. First, a condition in which simple isolated inflammatory pustules or boils appear in the integument of the muzzle in cattle and sheep. Second, a diffused inflammatory condition of the skin with the presence of multiple papular and pustular nodules over the skin of the nose and mouth, including the lower lip and extending in an upward direction over the face, but in a less marked degree.

The coronets of all feet may be similarly affected when the condition extends to the knees and hocks, and the disease is often referred to in some districts as mouth and foot disease of sheep, in contradistinction to foot-and-mouth disease.

Definite boils are developed, either singly or from the coalescence of small multiple pustules. A scabby, crusted, fissured surface is formed from which exudes a purulent discharge. The mouth is painful to the touch, and the parts bleed readily. After removal of the scabs, a suppurating, ulcerating, granulating and hæmorrhagic surface is exposed to view. In some bad cases ulcerative lesions may be present on the mucous membrane of the lips, and occasionally on the tongue, when it is in apposition to an extensive suppurating and ulcerating lesion upon the border of the lips or at the angles of the mouth.

The lesions of the mucous membranes are no doubt secondary lesions. There are no lesions on the feet at the seat of the foot-and-mouth disease, but a number of the animals may be showing lameness.

So much for the conditions and lesions affecting the mouth met with in animals suspected of foot-and-mouth disease. Time will only allow a passing reference to the condition of the feet and udder, which as a rule do not give rise to the frequency of suspicion as in lesions affecting the mouth.

With regard to the disease of the feet met with on enquiry, foul in the feet of cattle, and foot rot in sheep would be the most constant.

Foul in the feet often affects one animal and one foot, or a whole number of cattle may be affected in more than one foot, as I once witnessed in this city (Birmingham). Sometimes attention is drawn to the behaviour and lameness of the animal before any definite lesion is formed. The animal having shown persistent licking or " striking out," or both, of the one affected foot, to which the trouble has usually been confined.

In sheep, contagious foot rot calls for frequent attention, especially in outbreaks of a virulent type. Careful examination, however, generally settles the question at once. In foot rot the disease commences inside the digit, at the junction of the soft tissue with the horn, and works under and upward to the coronet, whereas in foot-and-mouth disease the lesions commence at the coronary band and the separation of horn and foot takes place from above downward. There is in foot rot the presence of the characteristic fœtid odour.

In foot rot the accompanying lameness is more often localised in one foot, at least for a time, whereas in foot-and-mouth disease of sheep the condition affects two or more feet simultaneously, the affected sheep moving like " a cat on hot bricks."

It is very necessary when dealing with marked and widespread lameness in sheep not to assume without a close examination that the lameness is due to foot rot. It is one of the conditions which gives rise to much anxiety to the patrolling veterinary officers during an outbreak of foot-and-mouth disease. Needless to say, in some instances the two conditions may exist in the same animal, which adds to the importance of and difficulties in examination, especially when the shepherd has been recently paring and treating the feet for foot rot.

There is also a painful condition met with affecting the feet of cattle, sheep, and pigs, which have been overdriven along hard roads, known as " travelling lameness." Large numbers of animals may be very

lame, and if down, unwilling to rise. The solar surface and heels are much worn, and there may be evidence of laminitis. The coronets are swollen, hot, and painful. Exudation and breaking down of tissue around the coronary band may exist in a number of cases, with or without actual separation of the parts. Blood blisters also form around the coronets and fetlocks. In pigs there is frequently a small punctured wound or hole at the heel, from which escapes a little blood or bloodstained serum, or the small rupture may arise between the digits. There is little or no tendency for the claws to be cast, unless suppuration sets in, as is sometimes the case. Usually a speedy and marked improvement takes place, at least in the majority of affected animals.

At the same time, cases of acute travelling lameness among cattle may present an exceedingly suggestive clinical picture of foot-and-mouth disease when the lameness is associated with marked salivation, and increased respiratory movements, due to enforced exertion and consequent distress to the animal; the symptoms being intensified during hot weather.

Pigs, especially, are often very distressed, not knowing which foot to place to the ground. They refuse food, and there is generally a rise in temperature. There is no true vesication and no evidence of contagion among contact susceptible animals. Naturally this condition gives rise to some anxiety on the part of the examiner for a day or so.

In pigs suffering from foot-and-mouth disease, the feet lesions are very marked and characteristic, lameness is intense, several feet are affected, the animals refuse to move or to rise if down, early separation of the skin and hoof takes place as a result of vesication, and there is readiness to bleed around the coronets. The claws are frequently cast, and can be found lying about the pens.

Necrosis and gangrene of the feet or coronets of pigs with lameness may be met with independent of foot-and-mouth disease.

There is also lameness due to injuries to the heels and picked up and embedded foreign bodies, as nails, gravel, cinders, etc., which may require forcible extraction; and the lameness due to inflammation around the interdigital gland in cattle and sheep,

Interdigital inflammatory lesions are sometimes present in recently dropped suckling calves. The lesions are near the soft horn, often on one side only, showing a central hæmorrhagic or intensely inflamed area.

Small fragments of grit and cinder have been found firmly embedded in the lesion, which is probably the exciting cause. Lameness is very marked. The dams are not affected in any way. There is usually a history to be obtained of a gravel, rubbish, or cinder track, over which the animals pass, often around gateways. Several calves may be affected on the same premises, and some, or part of them, may show inflammatory patches or actual abrasions in the mouth, as mentioned under catarrhal stomatitis.

The only lesions simulating foot-and-mouth which I have met with in the teats of cows are multiple, small or pinhead vesicles of a contagious nature unaccompanied by lesions in mouth or feet.

According to Fleming's Manual of Veterinary Science and Police, "the eruption on the udder and the size of the vesicles (in foot-and-mouth disease) have led the inexperienced to mistake it for the pustule of vaccinia or cowpox, but a careful study of the two eruptions will quickly dispel the error." In foot-and-mouth disease the vesicles are less uniform in appearance, vary in shape and size, and are mere blebs on an uninflamed surface. After rupture there is very little to be seen. In vaccinia, the vesicle arises upon the surface of a hard nodule and usually shows a central depression. The nodular lesions are surrounded by a red inflammatory zone. The vesicular stage is succeeded by the pustular stage which ruptures and dries, forming brown scabs on the surface of the nodules. The scab sloughs away, leaving a pale red or pink surface underneath, which later remains as the characteristic "cowpox" mark—a depressed area of white cicatricial tissue.

Reference has only been made to the living animal, but the veterinarian's opinion and advice may be sought after, or his suspicions aroused at *post-mortem* examination or during inspection of meat, by the presence of lesions of a doubtful nature, the difficulty being enhanced when only portions of the carcass are obtainable for examination. These remarks also apply to imported goods, including frozen tongues, feet, etc.

Now I think I have touched upon the commoner conditions met with when enquiring into the existence or non-existence of foot-and-mouth disease.

In conclusion, I would add that things in the field are not always so easy as they appear to be, and that a good deal of responsibility is incumbent on veterinary surgeons which the public may fail to recognise, still less to appreciate. But with a little time and care a differential diagnosis can in many cases be made at the first examination; others will demand further observation and consequently reservation of our final opinion.

The reason for the necessary precaution is usually due to the presence of some vesicular lesion, or one or more single "open" or healing lesions, for which no special cause can be assigned at the time. There is also the possibility of more than one condition affecting the same animal at the same time. It is under such circumstances that the examiner is specially guided by the presence or absence of lesions in the feet or udder, the general health and condition of the animal affected, as well as the health of the contact susceptible animals.

There is usually no difficulty in giving an immediate positive opinion in a typical case of foot-and-mouth disease, as met with in this country. But experience will decide that a definite and final opinion is not always justified at once when the usual seats of foot-and-mouth disease are implicated, or the lesions present are of a vesicular or doubtful nature. You will no doubt agree with me that fatal results may attend a too hurried conclusion from indefinite lesions or insufficient evidence.

Vitamines and the Influence of Artificial Processes.*

By W. V. GRACE, M.D., Pathological Department, Royal Infirmary, Chester.

I wish to say a few words about the way in which the accessory food factors are influenced by artificial processes such as storage, pasteurisation, heat and so on.

Let us deal first with the *Fat Soluble A Factor*. The primary source of this factor is found in the green leaves of plants and the marine algæ; these green leaves become the food of animals and these animals, in turn, become the food of man. If the food of the animal is deficient in this factor so this animal, as food, will be deficient in the quantity of fat soluble A that its tissues can supply. Thus, the milk yielded by a cow which has for some time past been receiving a diet deficient in fat soluble A, sooner or later shows the same deficiency. This is not a factor elaborated by animal tissue and it is found in considerable amounts in nearly all fats and oils of animal origin.

The common articles of diet rich in fat soluble A factor are: butter, cod liver oil, colostrum, cod roe and a smaller amount in liver, kidney, heart and fat fish, such as salmon. There is very little, if any, of this factor in margarine, lard, lean beef or mutton or bread in any form, there is a little in wholemeal bread. Cabbage, lettuce, spinach, tomatoes have a fair amount of this factor, and eggs—especially the yolk—are very rich in their content of fat soluble factor A.

This factor is not readily extracted by water, but is soluble in the solvents which dissolve fats, *e.g.*, ether, light petroleum and alcohol. In milk, the factor is partly in the fat globules and partly in the whey, so skimmed milk contains an appreciable amount of this factor. The vitamine in milk is not appreciably affected by drying, evaporating, condensing, pasteurising, boiling and sterilising, if these processes are not unduly prolonged. This is important.

The deficiency in lard is due partly to the deficiency in the diet of the pig, and also to the destructive effects of the processes through which the lard passes.

By alcohol and ether it can also be extracted from green vegetables, dried lucerne, etc.

It was formerly thought that this factor was comparatively stable to heat and that it could withstand heat and pressure for several hours without losing any of its value, but recent work has shown that this is only partly true and that the fate of this factor entirely depends on the presence or absence of oxygen. In the absence of any possibility of oxidation, this factor can withstand a temperature of 120°C. for twelve hours without appreciable loss in value, whereas four hours or this temperature with aeration destroys the factor almost completely. This factor is destroyed very quickly by ozone.

It is stable to alkali—NaOH—again provided that air is excluded. It is left along with the unsaponifiable residue and is very small indeed and is associated with cholesterol.

We come now to *Water Soluble B Factor* which is of special importance to maintain the health of nerve tissues. The chief sources of this factor are the cereal embryos, certain beans and peas and eggs—even dried eggs. Yeast is very rich in this factor and is unharmed in this respect by autolysis or extraction. Meat and fish are rather deficient in this factor.

This factor can withstand drying for long periods, as may be appreciated from the fact that its principal sources are found in the dry food stuffs. Its resistance to heat is considerable; it is destroyed very slowly at 100° C., but the destruction is more rapid as the temperature reaches 120° C. The practical conclusion to be drawn from this result is that in the baking of bread or biscuit, during which process the interior of the material does not rise above 100° C., no very serious dimunition of factor B need be apprehended. In preserving and canning foodstuffs, however, the temperatures employed are frequently much higher than 100° C., and tinned foods of all descriptions are liable to contain very little or no factor B and, unless specially investigated, should be regarded as free from this factor.

This factor is not susceptible to oxidation by the air or by ozone and, in this respect, differs sharply from factors A and C.

It resists the action of acids, can be extracted by alcohol, is soluble in water and can be stored indefinitely. It usually resists all artificial processes as well.

And lastly, *Water Soluble C Factor*, the absence of which is the cause of scurvy. This factor is hardly found at all in any of the cereals, it is present in considerable amount in the fresh green leaves of cabbages and the juice of swede turnips. Milk and meat have very little, but lemons, grape fruit, oranges and tomatoes are very rich in this factor. This factor, like factor A, is very susceptible to the effects of oxygen, it can withstand prolonged heating; the susceptibility to oxidation increases as the acidity of the solution decreases. This factor, when present in vegetables such as cabbage and potatoes, cannot resist cooking or drying; these processes destroy it almost completely, but in the case of lemons, oranges and tomatoes we find that quite the opposite is the case; dried lemon juice, re-dissolved, is just as efficient as the raw juice and the same holds for dried orange juice, and dried and tinned tomatoes are as efficient as the raw tomatoes.

This factor is also soluble in alcohol and water.

In these few remarks I hope I have been able to add to the interest of this subject by shewing how these factors are affected by some of the processes to which our food is submitted.

* Presented at the Joint Meeting at Chester of the North Wales Division N.V.M.A., and the North Wales Branch of the British Medical Association.

Erratum:—In the report of the discussion on "Foot-and-Mouth Disease as seen in Austria," for the reported statement by Col. T. D. Young, on page 1160 (Vol. V.), "It is infective after the vesicles are ruptured," read "It is generally considered that the blood is *non-infective* after the vesicles have ruptured."

The Clinical Bearings of Infection by the Tubercle Bacillus.*

By W. POWELL, M.D., Medical Superintendent, North Wales Sanatorium, Denbigh.

I propose to confine myself entirely to the clinical bearings of infection by the tubercle bacillus, bovine and human.

It is largely accepted nowadays that, except in massive or rapidly repeated super-infections, the usual method by means of which tubercle bacilli gain entrance to the human body is by ingestion—in other words, we swallow them—primary air borne infection, or infection by inhalation being comparatively rare, and furthermore that this infection usually occurs during childhood, if we are to believe the results of the Von Pirquet reaction in children.

The infection may remain latent throughout life, or give rise later on to actual disease at different periods varying with the individual. The bovine bacillus invariably gains entrance to the human body by ingestion; the human type of bacillus also, in the great majority of cases, gains access in the same way either through droplet infection or infection by means of the fingers ("*la tuberculose de touche a tout*" of the French), the portal of entry being the buccal, pharyngeal, or intestinal mucosa.

What part does infection with the bovine type play in tuberculosis in man? First of all, it is probably true that infection by both types of bacillus rarely occurs in the same case, and never in the same lesion; that infection by the one does not protect against the other, and that adaptation of the bovine to the human strain never occurs in the body. In those cases where cervical adenitis is associated with pulmonary tuberculosis, the infecting organism in both lesions is of the human type.

There is a good deal of variation in the figures given as to the proportion of cases in which the human and bovine types are associated as causal agents.

As far as pulmonary tuberculosis is concerned, this is practically always due to the human strain, as bovine bacilli have never been found in human sputum.

Cases of non-pulmonary or surgical tubercle, may be due to infection by the human or the bovine type—usually to the human.

It has been found that in roughly 33 per cent. of non-pulmonary tubercle, a history of direct exposure to infection from an open case of phthisis can be obtained. Again, surgical tubercle is prevalent in countries where the possibility of infection by the bovine bacillus can practically be excluded.

The proportion of surgical cases in which the bovine germ has been isolated varies with the observer, the country observed, and the organ affected, *e.g.* Fraser found that 60 per cent. of cases of bone or joint tubercle in Edinburgh was of the bovine type; Griffith's percentage, who also worked with Scottish children, was only 29 per cent. In Scotland the percentage of all cases in which the bovine type is found seems to be twice as large as in England.

Taking the organ affected, the percentage varies in a way that one would expect, *e.g.* in meningitis the infection is generally human; the percentage of bovine varying according to the observer from three to eighteen. In primary abdominal tubercle the percentage for all ages is fifty; for children, sixty bovine; bronchial glands, 5 per cent. bovine; in cervical glands (here the discrepancy is considerable) the average is 50 per cent. bovine under sixteen years, and 90 per cent. bovine under five years. The average for German workers was 33 per cent. bovine under five years. On the other hand, Mitchell of Edinburgh found the bovine bacilli in 90 per cent. cases of children under five years.

Can any indications be obtained clinically as to the particular bacillus responsible in any given case? I think sometimes they can. Speaking generally, infection by the human bacillus causes (as one would expect) a more profound systemic disturbance, or at any rate a different kind of systemic disturbance—a disturbance that may be too subtle to be distinguished by the ordinary clinical standards, temperature, pulse, etc., etc.—a disturbance that may be evidenced only by changes in temperament. The mentality of a patient suffering from even the earliest pulmonary lesion is much more profoundly affected than that of a patient suffering from a very advanced type of surgical tubercle, and this difference cannot be entirely explained, I think, by the fact that the lungs, being the most freely movable organ, would naturally be associated with a greater toxæmia.

This difference strikes us very forcibly at the North Wales Sanatorium where we have on one side of the Institution 142 beds for surgical tubercle in all its stages; on the other side 92 beds for early pulmonary cases. A large number of those on the surgical side are much more distressing cases than almost any of those on the medical side, and yet the atmosphere of the two sections is strikingly different, contentment being the keynote of the one, and capriciousness—caprices of diet, of temper, of conduct, of morale, on the other.

In bovine infection, again, the lesions tend to be localised and single; if multiple, they tend to effect homologous structures, *e.g.* carpus, tarsus, humerus, femur, etc. Infection by the human variety tends to be more acute, more rapid in its course, to become more quickly multiple and to be more often associated with pulmonary disease: a lingering death from amyloid disease is characteristic of bovine infection, a more rapid death through a sub-acute tuberculous pyæmia, of infection by the human bacillus.

The administrative measures necessary to prevent the bovine infection of human beings, I must leave, but we should not forget that, although bovine infection is responsible for an appreciable number of cases, the whole of medical and the greater proportion of surgical tubercle are due to direct or indirect infection from open cases of consumption of the lungs in human beings.

* Presented at the Joint Meeting at Chester of the North Wales Division N.V.M.A., and the North Wales Branch of the British Medical Association.

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PRECISE ACTION.

The oft-time indefinite nature of the foot-and-mouth disease clinical picture in the early stages of outbreaks, and the responsibility placed on Veterinarians for precise diagnosis and reasonably immediate action is our excuse this week for the re-publication of Mr. A. Holman Berry's paper on "Some Remarks on Foot-and-Mouth Disease and other Diseases in Relation to Differential Diagnosis," read before the Midland Counties Veterinary Medical Association at Birmingham, on May 14th, 1918, and published in *The Veterinary Record* of June 8th, 1918. The article will appeal to members of the profession at the present time, when so much public interest surrounds the disease, and its value lies in the fact that it is from the pen of a public servant in immediate touch with outbreak situations. Under the policy of "stamping out," it is not given to the majority of us to witness what might be termed classic symptoms of the disease in their entirety: more often we are faced with conditions which give rise to uncertainty. What might have been true in 1875, as expressed in Fleming's *Manual of Veterinary Science and Police*, when the disease was familiar to the many, is not applicable to-day. It is easy enough to diagnose foot-and-mouth disease when it is in full blast, but the situation may not be so easy when one is confronted with a single case and that of an indefinite or confusing nature. Hasty conclusions or unnecessary delays alike lead to disaster. Precept and example come, therefore, very well from the experienced. As Mr. Berry truly points out, it is the appreciation of details in routine procedure in respect to this markedly infective disease that counts for so much in the veterinary surgeon's responsibility towards prevention of spread. Where infection is subtle and many loopholes of escape are possible, our action must be doubly precise. Perhaps the worst feature of the foot-and-mouth situation in this country to-day is the inexperience and the lack of knowledge of the disease on the part of stock-owners. Delays in reporting and consequent early action in control are attributable to this fact. Here, again, is a matter touching veterinary responsibility, and unquestionably it suggests an active and complete propaganda of information, instruction and demonstrations, even to the point of the harmless, yet efficacious, film appearances of the disease.

A Note upon the influence of Heredity in "Cross-Beak" of Fowls.*

By Tom Hare, M.B., Ch.B., B.V.Sc., M.R.C.V.S.,
The University of Liverpool.

The recent communication of Mercier, L. and Poisson, R. (Nouvelles Observations sur les Poules a Bec Croisés. *C. R. Soc. Biol.*: 1925. xciii. 1214), recalled an entry made in my notes during 1922. When examining the birds of a poultry breeder, I was shown a White Wyandotte hen, two years of age, and in excellent condition, with a crossed beak; also a White Wyandotte pullet, five months of age, with an exact replica of the disfigurement. In both birds the upper mandible deviated to the right of the mid-line of the head, while the lower mandible, normal at its base, had an anterior extremity curving upwards and to the left of the mid-line. The owner at regular intervals pared away with a knife the anterior extremities of the mandibles, which, if permitted to grow out of apposition, would, in his opinion, have prevented the prehension of grain food.

The owner stated that the hen proved such an excellent layer that he mated her with an unrelated Wyandotte cockerel, and introduced several of her eggs to complete his incubator, containing a purchase of pure Rhode Island eggs. The hatch proved disappointing, and he only reared a few chickens, of which the Wyandotte pullet was the only white bird surviving. Though he did not mark his eggs, and could not positively affirm that the deformed pullet was hatched from the Wyandotte's egg, yet the evidence is favourable to the blood relationship of hen and pullet being established, and to the inference that the deformity of the pullet was an inheritance from its maternal parent.

Mercier and Poisson, having recognised the prevalence of "cross-beak" in fowls, conducted a series of experiments. They mated a "cross-beak" hen with a normal cockerel, and incubated seven separate sittings of the deformed hen's eggs. From the thirty-four eggs incubated, three proved unfertile, six failed to develop, five died in the shell, and 20 hatched. Of the five "dead in the shell" embryos, three were cross-beaked and, of the twenty hatched, only twelve lived, one of which, when one month old, developed a crossed beak.

They concluded from the results that "cross-beak" was an hereditary defect.

These authors recognise two types of the deformity:

Type No. 1: The superior mandible is in the axis of the head, while the inferior mandible deviates from its base either to the right or to the left. Quoting Rabaud, E. (La Tératogénèse, *Encyclopédia Scientifique*. Doin, Paris. 1914, p. 317), they consider that birds affected with this type of defect perish owing to their inability to prehend their food.

Type No. 2: The inferior mandible is in the axis of the head, or its extremity may be slightly set to one side, while the superior mandible deviates from its base either to the right or the left. In this type the birds develop normally, as they are able to pick up their food.

*From the Thompson Yates Laboratories, The University of Liverpool.

ABSTRACTS AND REPORTS.

["Vitamin A in Beef, Pork and Lamb," R. HOAGLAND & G. G. SNIDER. *J. Agric. Research*, 1925, xxxi. 201-221.]

At the outset the authors emphasise the fact that in their experiments they have dealt solely with the growth-promoting factor, now called "vitamin A" and have not taken account of the anti-rachitic constituent, or "vitamin D" of the original "fat soluble A vitamin."

The vitamin A content of beef, pork and lamb was measured by the growth induced in young Albino rats from a standard and long-established strain, when fed on a ration adequate in other respects but containing dried lean meat as the only source of vitamin A. The standard ration included dried yeast in order to guard against the deficiency of vitamin B. The muscle tissue to be tested was trimmed free from fat and connective tissue, ground, mixed with water and toluol in the proportion of 800 gm. meat, 400 c.c. water and 40 c.c. toluol. The mixture was spread out in a thin layer and dried in a current of air at a temperature not exceeding 60° C. (see abstractor's note). After drying, the meat was powdered and stored in stoppered bottles in the dark at 34-36° F. until required. Each sample of dried meat was analysed for nitrogen and fat before being incorporated into the standard ration.

The results of testing ten samples of beef showed that beef is relatively poor in vitamin A, but that, when used in rations in proportions of 50 per cent. or 95 per cent., nearly sufficient vitamin A for normal growth was furnished. In the experiments with 95 per cent. beef, no vitamin B was supplied and hence the slight deleterious results may have been due to this deficiency.

Experiments with rations varying in pork content from 15—95 per cent. were made, but in no instance did a ration supply sufficient vitamin A to meet the requirements of growing rats; although rats fed with the 95 per cent. ration developed fairly well for a time, they subsequently declined in weight and developed the usual ophthalmia.

The samples of lamb tested appear to show rather wide differences in vitamin A content. Of the six samples tested, three were rather poor, one contained a fair proportion and two samples were richer in vitamin A than any of the other samples of meat examined.

Abstractor's Note.—The authors appear to be unaware of the work of F. G. Hopkins (*Biochem. J.* xiv. 725. 1920), in which he shows that with simultaneous aeration destruction of vitamin A proceeds with considerable rapidity at 80° C. and that the growth of rats fed on fat (as source of vitamin) that had been exposed (not aerated) in thin layers for periods of about a week at temperatures as low as 15°-25° failed. Hence it is probable that none of the vitamin A content of the meats was destroyed by the method of preparation of the latter, thereby somewhat vitiating the results obtained.—W. R. WOOLDRIDGE.

Annual Report of the Veterinary Department of the Government of the Gold Coast, 1924-1925.

The pioneer veterinary work of our colonies and dependencies cannot fail to present a fascination to the veterinarian. The results of initial spade work, the progress which time shows, carry in themselves the satisfaction which spurs on the enthusiast and the conscientious to efficient effort even in the tropics. There are many sidelights, too, in the sphere of the veterinary officers' duty, many directions in which his special knowledge is required, and he is perforce the accepted *vade mecum* of the welfare and disabilities of the animals, domestic or otherwise, inhabiting the land. The foregoing fits very well the work in the Colony of the Gold Coast, and Captain Beal and his small staff are to be congratulated on it.

The report is divided into three Sections, Part I dealing with Administration and Establishments; Part II, the Veterinary Section, accounting for the various diseases, and Part III, the Live Stock Section, dealing with the live stock trade, animal husbandry and a by-product trade. For administrative purposes the country is divided into three areas, Southern, North-Eastern and North-Western, and the establishment comprises a Principal (Captain W. P. B. Beal), and two other veterinary officers (Captains D. G. Grealy and J. L. Stewart); two inspectors of live stock (Mr. A. E. Millar and Mr. J. F. Hedley), one veterinary superintendent, two veterinary assistants, and two clerks. A Veterinary School for the training of young Africans as veterinary assistants and inspectors of live stock is maintained, and for aiding in the prevention of spread of epizootic disease and stopping the smuggling of live stock across the Border a Cattle Patrol Service consisting of one Sergeant and thirty-one constables (African) was inaugurated. There are four dispensaries, the principal being at Tamale, the headquarters, and treatment is carried out by students under the supervision of a veterinary officer.

Of the various contagious and specific diseases the following are recorded: anthrax (eight known to have died), contagious bovine pneumonia (seventy-seven animals slaughtered), epizootic lymphangitis (six cases), foot-and-mouth disease (very benign and not reported by the natives), mange in dogs (head scab in sheep used to be very common during the years previous to the war), myiasis (hairy green fly), parasitic gastritis in sheep (hæmonchus contortus), foot-rot, piroplasmosis, hæmorrhagic septicæmia, strangles (as common as in Europe), trypanosomiasis (sixteen cases in horses). By far the most serious disease was rinderpest, forty-nine outbreaks being recorded. Two-thousand, four-hundred and ninety-six cattle were inoculated against the disease by the simultaneous method, and four-thousand, one-hundred and ninety-six by the serum alone method. Mortality recorded was 12.5 per cent. in the South and 3 per cent. in the North. Anti-rinderpest serum was obtained from Kenya Colony, Egypt, and Haute Senegal, French West Africa, the chief cattle breeding area of

West Africa, is the principal source of infection, and the methods pursued by the French Government in control would appear to be defective.

A considerable import trade in live stock from French territory exists, the animals passing through various quarantine stations. During the year 29,396 cattle (15,875 less than the previous year, owing to rinderpest in French territory), 40,361 sheep and goats, 5,042 donkeys and 211 horses were imported. There were similar large importations into Ashanti, donkeys figuring largely on the list.

In Animal Husbandry the general type of cattle is improving as a result of the castration of weed scrub bulls. Shorthorn and Hereford crosses too are in evidence. The type of sheep would appear to be on the downward grade, owing to the best females being killed or sold for export. Donkey breeding is flourishing, and it is hoped to improve horse breeding by specially selected good native premium stallions. Fifty-seven pure bred English poultry have been issued to Chiefs in the northern territories. An interesting and instructive Live Stock Show was held at Han in the North, under the auspices of the Political Agent, and judging from the large number of entries, was a great success. Instruction was greatly added to by magic lantern displays, and these were made more enjoyable to the large audiences by putting in an occasional slide of some well-known local resident.

J. M.

Stallion Warranty Case.

Sheriff's Findings.

Perth, 23rd November, 1925. The Sheriff having considered the cause, Recalls the Interlocutor of the Sheriff Substitute of 4th April, 1925; of new Finds in fact (1) that on 12th October, 1921 the horse "Savona" was sold to the Pursuer under conditions identical with those in the Sale Catalogue No 7 of Process; (2) that the Defender by signing the particulars No. 63 of Process had agreed to sale under these conditions and in particular to the description therein of the said horse as "a sure stock getter"; (3) that but for the said conditions and description the Pursuer would not have purchased the said horse; (4) that the horse suffered from partial incapacity in respect that he was unable to do the work of an ordinary stallion travelling the roads for hire; (5) that he was not a sure stock getter; and (6) that the said representation that the horse was a sure stock getter was false and was made by the Defender in the knowledge that it was false; Finds in law that the Defender is liable to the Pursuer in damages for the loss resulting from the said fraudulent statement; Assesses the damages at the sum of Two hundred and ninety-eight pounds Sterling, for which sum decerns against the Defender in favour of the Pursuer; Finds the Pursuer entitled to expenses on the higher scale against the Defender in the Court below and of the Appeal, and remits to the Auditor to tax and to report; Sanctions the employment of one Counsel except as to the motion of 2nd February 1925, and certifies as skilled witnesses Nos. 5, 16 and 17 for the Pursuer and 6, 7 and 8 for the Defender. (Signed) Condie Sandeman.

Note: At the Auction Sale in Lanark upon the 12th of October, 1921, the Pursuer bought from the Defender the entire horse "Savona" which was described in the Catalogue as "a sure stock getter free from vice." It was a condition of the contract that all particulars and warranties should be entered in the Sale Roll and that the entry should be held as the only competent proof; and it was also provided that the sellers must disclose any vice or radical defect in the horse not visible on an ordinary examination, with the penalty that failure to disclose resulted in nullity of the sale. Clause 7 provided for notice being given of breach of warranty on the 19th of October for animals sold upon the 12th of October.

The Pursuer purchased the horse for £48 with the intention of shipping him to Canada for sale there as a stallion. Before the sale he had an interview with the Defender at which there were present Picken, a friend of the Pursuer's, and the Defender with a friend of his named McGill. The Pursuer says that at that meeting he explained to the Defender the purpose for which he intended to buy the horse, and got assurance from the Defender that the horse was in every way a desirable purchase. The Defender denies this evidence and says that the Pursuer asked him nothing about the horse at all and did not tell him about Canada. In chief Picken corroborates the Pursuer, but in cross examination admits that he is not quite sure about the mention of Canada, while McGill says that he did not hear Canada being mentioned.

Looking to the view which the learned Sheriff Substitute has taken of the credibility of the Defender; looking to the probabilities of the case; and keeping in view that, immediately after the sale, or shortly after the sale, the Pursuer wrote the Defender, *apropos* of certain rumours he had heard, asking whether the horse was fit to be sent to Canada, I am satisfied that, at the interview before the sale, not only did the Pursuer ask details about the horse but told the Defender that he intended to send it to Canada.

Sometime after the sale the Pursuer heard rumours that the horse's record was a bad one, and he accordingly wrote asking for explanations. The letter has gone astray, but the Pursuer explains that in that letter "I asked him specially if the report was true because, if it was, I would not ship the horse." "I told him that I had heard that the horse was a bad doer." In reply to this letter the Pursuer received an answer which is No. 8 of Process. The letter is evasive of the question asked, but in my opinion it is intended to represent that the horse was a "sure stock getter" in the sense of the Catalogue description, and that the Pursuer would be justified in sending it to Canada.

The history of the horse was a bad one. In 1919, when a three-year-old, it was hired out to the Dundee and Carse Society and was put upon the road in April of that year. He travelled for something less than a fortnight in charge of the witness Craig. He persistently refused to serve mares that were offered to him and was taken off the road. The Defender denies knowledge of the horse's failure except to the extent of his refusng one mare. Craig says that he reported the whole history of the horse on this occasion to his master. I am quite satisfied that Craig's statement is true, because I cannot understand otherwise how the Defender not only agreed to cancel his contract with the Society, but actually assisted them to get another horse to take its place.

In 1920 the horse was booked to the Kintyre Society but when the season came round the Defender wrote to the Society a letter addressed to Mr. Millar, a member of the Committee. This letter also is missing, but Mr. Millar depones that in that letter the Defender said "It was of no use Savona coming as he would not serve his mares."

From that date onward till the date of the sale to the Pursuer, "Savona" remained at the farm of the Defender, but, according to the evidence, served at the most some sixteen to eighteen mares. A good deal of criticism was levelled at the service of these mares and doubts were thrown upon the evidence relating to these services. I assume in the Defender's favour that the evidence about these services is true.

After the horse was sent to Canada it entirely failed as a stallion, refusing practically all the mares that were offered to it. From the Pursuer's point of view it was, therefore, worthless.

Reading the evidence as a whole, I find it proved in fact that the horse was not as represented "a sure stock getter." This was a material fact and was, in my opinion, known to the Defender at the time when he made the representation. "A sure stock getter" will serve anything from 70 to 130 mares in a season and the Defender knows that. He knew that the horse when on the road refused all its mares. He knew that, accepting his own story, in two years it had only served about eighteen mares. He was, in my opinion, without any justification for saying that the horse was a "sure stock getter," a statement which he must have known was false, or made rashly without any ground for believing it to be true. It follows that, in my opinion, this contract was induced by fraudulent misrepresentation made by the Defender and that he is liable in damages.

The damage sustained by the Pursuer resolves itself into the loss of the price which he could have obtained for the horse in Canada, leaving him to pay the expenses of buying the horse and taking it to Canada and selling it there. I see no reason for reviewing the figure which the learned Sheriff Substitute has arrived at when he assesses the damage at £298, which, in my opinion, is a very fair figure indeed.

It is right that I should mention an argument that was submitted to me upon the question of a warranty and the effect on the warranty in the circumstances of this case, of the time limit imposed by Section 7.

The question of fact involved is this. The horse's quality as "a sure stock getter" could not be properly tested till after eighteen months from the date of the purchase. On that assumption it was argued, on the one hand, that where a warranty is given with a time limit and it is impossible that the time limit should be observed because sufficient time was not allowed to make the appropriate test, the time limit flies off, and the warranty stands. On the other hand, it was maintained that a warranty in these terms must be read strictly and if it was impossible to test the horse within the time, the warranty fell. In the view which I have taken of the case, it is not necessary to decide this legal question, but I may say that, in my opinion, it was a condition of the warranty that the test should be made prior to the 19th October. That was an inherent condition of the warranty and if it was impossible for the condition to be fulfilled, then the warranty would fall. (See Bywater v. Richardson 1 A. and D. 508).

A further question that was argued was whether or no the failure of the horse to serve the mares was a radical defect in the sense of Art. 4 of the Conditions. That question is of no importance in this case, because the sanction for failing to disclose radical defect is the avoiding of the sale and this, of course, would be of no use to the Pursuer, who is not attempting to avoid the sale, but holding to the sale and claiming damages.—(Intd.) C.S.

Royal Sanitary Institute Courses.

As will shortly be seen from an announcement to appear in our advertisement pages, courses of lectures and demonstrations for meat and food inspectors, held under the auspices of the Royal Sanitary Institute, will commence on Friday, February 5th. The course consists of Systematic Practical Training in the inspection of Meat at a Cattle Market, including Demonstration on live cattle and sheep, slaughtering and dressing of animals, names and situations of the organs, diseases of animals, methods of stalling, arrangements of markets and byres, etc. It will be conducted by J. R. Hayhurst, M.R.C.V.S., D.V.S.M. (Vict.), Superintendent and Chief Veterinary Inspector, Metropolitan Cattle Market, and a Veterinary Inspector of the City of London and the London County Council (D. of A. Acts).

Mr. Hayhurst and Lieut.-Col. T. D. Young will also give lectures which may be attended by those taking the course. Full particulars can be obtained by application to the Director and Secretary, 90 Buckingham Palace Road, London, S.W.1.

DIVISIONAL REPORT.

Central Division.

(*Continued from page* 1175, *Vol. V.*)

The President: With regard to the Frank Garnett Memorial Fund, I do not quite know what further action we can take. This Society has contributed the sum of twenty guineas, and I think it is for individual members to subscribe, or to bring pressure to bear on those who have not yet subscribed.

Mr. J. W. McIntosh: If I may be allowed, I should like to say a few words on this subject, as a member of the Subscription Committee which is dealing with this matter. A contribution, as ordinarily given by a Society from its funds, is considered by some as amounting to a contribution from individual members. One remembers all that Frank Garnett did for the profession, and, personally, I can recall his labours on our behalf from the time at which I entered the profession, upwards of more than thirty years ago. Throughout the whole of his life he devoted a great deal of his time, and a great deal of his money to the advancement of the profession. I should like to ask, as an individual, that every member should give what he can—whether much or little, thereby doing something to acknowledge the debt we, as a profession, owe to the memory of the late Frank Garnett. (Applause.) £400 is a ridiculous sum, I think, considering the great work Garnett did for his profession.

Major Hobday, speaking "as an old college chum of Garnett's," warmly seconded the remarks of Mr. McIntosh. Mr. Garnett always had the good of the profession at heart. He would like to see some committee appointed to draw up a fresh appeal. Many did not give, or give again, merely because when an appeal came it was put aside on the desk and forgotten.

The President: A good many of us have already subscribed but, over and above that, Mr. Bullock suggests that this Society should approach individual members in case they have not already subscribed. Would it meet with your approval if we did that by circular letter to every member, asking him to subscribe, if he has not already done so?

Major Rees-Mogg: Could not that be done through the notice of the next meeting? I propose that, as I think the appeal would attract more attention if circulated by that means.

The proposition was seconded by Colonel Young, and carried.

Nominations: Mr. J. Richard Hudson, of Retford, Notts., and Mr. C. H. Spurgeon, of Petworth, Sussex, were nominated for membership.

Morbid Specimens.

Mr. H. J. Parkin: The specimen I have to show you is one of the hind leg of an Airedale, illustrating the severe injuries which may be caused by a small

indiarubber band. This had been left round the leg of the animal, presumably by children in play, who had forgotten it. The tendon behind the hock is completely severed. The lesions are very plain to see. The history of the case was that the dog was supposed to have been run over, and that it had been taken to an animals' hospital (not a veterinary establishment) and "treated." I do not know what the treatment was, but I do know that they failed to diagnose the case. The animal had to be destroyed, and this is the band that caused the micshief.

Major F. T. G. HOBDAY: Was it gangrenous below? (No.) I should like to say that this specimen is exceedingly interesting. I have met with the condition frequently, especially round the cat's foot, but my most curious experience was of one round a dog's neck. Its existence was not suspected, but the pressure caused by the embedded band caused the dog to emit a sound which gained for it the appellation of "the whistling dog." (Laughter.) It was a small rubber ring, slipped round the neck of a Yorkshire Terrier, and when one looked at its neck one saw, not only the concentric marks, but little holes all the way round it. I have also seen it round the penis of a dog and round the tongue.

Capt. H. KIRK: I have a specimen here which was removed from a Fox Terrier one day last week. I was called to see the dog, which belonged to a doctor, on the Saturday night. There was continuous vomition, and the dog showed every symptom of the presence of a foreign body in the bowel. I suggested to the doctor an X-ray photograph should be taken, but within two hours of the animal's arrival at the surgery it died. I made a *post-mortem* examination and there was a foreign body in the bowel, although I had previously failed to detect its presence. It was an iron motor nut. I found, further, an invagination of the duodenum into the stomach. It is usual, in invaginations, to get the bowel proceeding in the direction of the peristaltic waves and not against them, and I felt it was a case of sufficient interest to bring to the meeting. (Applause.)

Major HOBDAY: I have brought here, at the request of Mr. Llewellyn Bevan, Director of Research in the Veterinary Department, Southern Rhodesia, a little apparatus which he asked me to bring to your notice. He calls it the "abortoscope," and its purpose is the detection of abortion in cattle, and if it proves, on test, to do what he suggests it will do, it will be one of the best and readiest methods of detecting abortion in cattle, and it will enable the practitioner to do it with great facility—moreover, to do it himself, so that he will not have to send material to a laboratory to have it notified. Mr. Bevan forwarded to me a number of boxes containing the special apparatus for the single application of the agglutination test for the detection of infectious abortion in cattle. He first demonstrated the apparatus at a meeting of veterinarians and medical men held in Salisbury on the 12th November, 1921, and since then it has been in regular use at his laboratory. At that time, infectious abortion being a scheduled disease, the chief veterinary surgeon did not consider it desirable that the apparatus should be used by laymen for fear that they should, by means of it, detect the presence of the disease in their herds, and dispose of infected animals rather than run the risk of quarantine. They had, therefore, in practice made use of the so-called pipette method, described by Mr. Bevan in the *Journal of Comparative Pathology and Therapeutics*, December 31st, 1915, which made it necessary for the sample of blood to be forwarded to the laboratory for the completion of the test. In that way the presence of the disease became known to the veterinary department. As a result the "abortoscope" had only been used there at the laboratory, where it had from time to time been improved and its efficiency established.

Mr. Bevan writes:—

"The test, as you will at once realise, is based upon the Widal Test, except that the separation of serum from clot is not necessary, the whole blood being used. I have made innumerable experiments and find that by reason of the composition of the 'emulsion' (or rather, 'suspension'), this fact in no way interferes with the accuracy of the reaction.

"I have frequently been asked by veterinarians who have been struck with the simplicity and accuracy of the apparatus, to make it available to the profession, but I have hesitated to do so until, during one of my periods of leave, I could attend a meeting of one of the larger veterinary associations and suitably demonstrate its use. But as the prospect of a visit to England is still very remote I have decided to ask you to be kind enough first to test the apparatus, and secondly, if you find it satisfactory, to introduce it and demonstrate its use at some of the many meetings which I know you attend, fter which, a little note which I will write could be published in the *Veterinary Journal* and other professional papers."

In response to Mr. Bevan's request, I asked a number of experienced practitioners to test the method, and the results have been so encouraging that I allowed his article to appear in the October issue of the *Veterinary Journal*, and requested him to send over a further supply, which I shall be pleased to distribute to any practitioner who will give it a trial and promise to return me either for publication or transmission to Mr. Bevan, his results.

It appears to me that if it is really reliable it will be a method of great value in that it not only saves considerable time but is cheap and enzbles a practitioner to do his own testing, and thus take the fee himself, instead of having to pass it on to a laboratory consultant.

I have here, continued Major Hobday, some of the tubes which have not been used, containing the special material. You can see the little wire in which the blood is collected. The method of testing is to take the blood from the ear, take one of the tubes, extract the piece of wire and dip it into the blood, replacing the wire in the tube when that is done. Well shake up, and allow it to stand for 16 to 18 hours. If, on the next day, holding the tube up to the light you

can read through the fluid the word "infected," that animal is an infected beast. If it is not an infected beast, this fluid becomes blurred as you will see, from this set of tubes, which has been used by Mr. Arthur Payne, of Weybridge.

I have a report on the test from Mr. Payne, in which he states that the results coincide with the fact that the animals were known, or not known, to be infected with the abortion bacillus. I have here also a very interesting letter from Mr. Hughes, B.Sc., F.R.C.V.S., of Oswestry:—

Dear Professor Hobday,—We have had occasion to vaccinate some cattle on a farm where we had every reason to believe that contagious abortion existed and took the opportunity of making trial of the 'Abortoscope' with a view to discover more particularly how its findings might tally with the known clinical facts.

It seems to have come through the test with flying colours, as it has put down as infected the three cases known to have aborted, though No. 2 not quite so completely agglutinated as the other two.

I have discovered a practical point that I will communicate to you for what it may be worth in saving time, temper and trouble, *viz.*, I found, with the first few, that the wire filled itself with blood badly by capillarity, but if the position is reversed, as per sketch, it will fill itself quickly and conveniently by gravity. This remark applies to the snipping of the ear and capillary hæmorrhage —I did not try the puncturing of the vein method.

Results.	*Abortoscope at 18 hours.*
No. 1. White Heifer, 3 years, 4 months, gone in calf and never aborted.	—not infected.
No. 2. Roan Heifer, 1 year, 9 months, aborted a month ago.	—*infected.*
No. 3. Roan Cow, 5 years, aborted three or four weeks ago.	—*infected.*
No. 4. Red Heifer, 1 year, considered clean.	—not infected.
No. 5. Roan Cow, 4 years, aborted four weeks ago.	—*infected.*
No. 6. Roan Cow, aged, on premises and not aborted during past three years and calved to time fourteen days ago.	—not infected.

I am returning the tubes.—Yours sincerely, H. TUDOR HUGHES.

26 Willow Street,
Oswestry.
October 12th, 1925.

The PRESIDENT: We are very much obliged to Major Hobday for having brought Mr. Bevan's "Abortoscope" before us. (Applause.) Most of you, perhaps, read about it in the *Veterinary Journal*. I take it that Major Hobday has a supply of the material in case anyone asks him for it.

Major HOBDAY: I have a few tubes, Sir John.

The PRESIDENT: The inference is that any member who desires to try this should apply to you—is that so?

Major HOBDAY: For the moment, or they can apply to Mr. Bevan.

Professor WOOLDRIDGE: I should like to exhibit this specimen, which consists of a diseased tooth which I removed from a grey mare this morning. The mare was brought in for an enlargement of the inferior maxilla. On examining the mouth, I saw a defective second lower molar, and it had apparently split. In the cleft there was a deposit of offensive food debris. I put the mare down and chloroformed her for the extraction of the tooth and, as you see, it came away in a number of pieces. The lowest portion, fortunately, was also loose in the depth of the alveolus. From the hole in the jaw I was able to approach it, push it within the reach of the forceps and eventually to remove it. The interesting thing about it is that the decay process has taken place down in the centre of the tooth, and caused it to disintegrate in this way. I think the results are likely to be very satisfactory, although there is likely to be a permanent enlargement of the jaw.

I have also brought in my pocket another of these cystic calculi which I have taken from the bladder of a Pekinese bitch. I had hoped that Mr. Leonard Balls, whose the case was, might be here and have brought with him a number of calculi, varying in size up to that of a horse bean, that this small bitch had passed spontaneously from time to time. In this instance one had to do a prepubic cystotomy. The wall of the bladder was phenomenally thick, and therefore one had to be content with a single row of sutures in closing it. However, this specimen has lost most of its interest through the absence of the other calculi.

May I refer to the interesting case, shown by Capt. Kirk, of a foreign body in the ilium, and particularly to the forward invagination of the duodenum into the stomach. In my experience, it is a perfectly unique case. As Capt. Kirk pointed out, as a rule the intussuscepting movement is in the opposite direction; I have, however, met with a case of double intussusception—one forward and one backward. The interesting thing in this case is to speculate as to how it occurred, and I think there can be no doubt that it was due to a very violent reverse peristalisis. As we know, in obstruction, persistent vomition is a constant symptom. It is a most interesting specimen, and I am very delighted to have seen it. So far as the foreign body is concerned, if Capt. Kirk had had the case in time to make a diagnosis, surgical treatment might have been successful.

Royal Sanitary Institute Congress: Delegate's Report. The President then called upon Lieut.-Col. T. D. Young, the Division's delegate to the Royal Sanitary Institute Congress held at Edinburgh in July, to submit his report.

[Col. Young's report was published last week.—Ed.]

The PRESIDENT: I am sure we are all deeply grateful to Colonel Young for giving us this report (Applause) and I think we should have that report published in a prominent position in the *Veterinary Record*. I will personally see that that is done.

I am sure we quite agree with everything that Colonel Young has said about the position of the veterinary surgeon in meat and milk inspection. I am very delighted to hear of the valuable papers that were read by prominent members of our profession and, indeed, we have already read them in our periodicals. I do not know that I have anything more to say on the subject just at present, except to thank Colonel Young from the chair, very heartily,

for the great trouble that he took in attending this conference, and also for the great care with which he has compiled his report. (Applause.)

Professor WOOLDRIDGE: May I second your proposition, sir, and, in so doing, very heartily congratulate this Society in having Colonel Young to represent it at the congress. It is undeniably unfortunate that, on such an occasion, there are several papers simultaneously being delivered upon subjects of interest in more than one section of the congress, but, if the veterinary delegates have not been able to attend the medical officers' section, and the medical officers of health have been unable to attend our section, yet the pioneer work is going ahead in a very satisfactory way. (Applause.)

Presidential Address. At this stage the PRESIDENT, Sir John Moore, delivered his address from the chair on the subject of Foot-and-Mouth Disease as seen in Austria. [This paper appeared at the commencement of last week's issue of the *Record*.]

The meeting concluded with the passing of hearty votes of thanks to the President for his paper, and for his conduct of the meeting, and to the gentlemen who had exhibited morbid specimens.

J. F. MACDONALD,
Hon. Secretary.

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

January 6th—N.V.M.A. Committee Meetings 10 a.m. —12-30 p.m.
Council Meeting 2-30 p.m.

„ 6th—R.C.V.S. Committee Meetings 4-30.

„ 7th—R.C.V.S. Committee Meetings 10-30 a.m.—5 p.m.

„ 8th—R.C.V.S. Committee Meetings 10-30 a.m.—1 p.m.
Council Meeting 2 p.m.

„ 11th—R.C.V.S. Issue of Overseas Voting papers for annual election of Council.

„ 12th—Meeting of the Derbyshire Division at Derby.

„ 14th—Meeting of the Central Division, 10 Red Lion Square, W.C.

„ 21st—R.C.V.S. Special Meeting of Council.

March 31st—Garnett Memorial Fund—Closing Days.

April 1st—R.C.V.S. Annual Fee of £1 1s. 0d. due.

„ 8th—R.C.V.S. Committee Meeting.

„ 9th—R.C.V.S. Committee Meeting; Council Meeting 2 p.m.; Garnett Memorial Fund Committee Meeting.

Foot-and-Mouth Disease.

OUTBREAKS REDUCED.

The Ministry of Agriculture recently issued the following:

During the week ended December 19th, only five outbreaks of foot-and-mouth disease have occurred; one each in Derby, Gloucester, and Southampton and two in the county of Stafford. The one in the county of Southampton constituted a new centre of disease; the other four were in existing infected areas. The position is, therefore, more satisfactory than it has been for many weeks.

The Ministry considers that this result is to be attributed in no small degree to the "Standstill" Order which was applied to the Midlands and the South of England, and which was brought into operation on November 17th. In the four weeks preceding that date there were twenty-nine, sixty-five, thirty-four and twenty-two outbreaks respectively. In the four succeeding weeks there have been twenty, fifteen, ten, and five outbreaks respectively. The question of the withdrawal or reduction of the "Standstill" area will be considered about January 1st, provided the position remains satisfactory.

"While the Ministry is glad to announce such a substantial improvement, it must also take the opportunity of pointing out to farmers and others that the improvement can only be maintained and the disease once more eradicated if the utmost vigilance is continued over all farm stock, any suspicious symptoms being immediately reported to the police in accordance with the law. Copies of the leaflet entitled 'Advice to Farmers,' which have been widely circulated in connexion with the present outbreak of the disease, are always available at any police station, and farmers would do well to obtain a copy if they have not already done so, and carefully observe the precautions therein described when the circumstances arise."

At a meeting of the Health Committee of Wrexham, Councillor Wm. Thomas said it was a deplorable thing that they had got to have men to inspect their meat who did not understand their job. Those who were in the trade, both in the town and district, had carcases condemned without any redress at all, and they claimed that they must have men who understand the question of meat inspection thoroughly. He had nothing to say against the Borough Inspector, but he must say that, so far as the butchers were concerned, they refused to have plumbers and road surveyors to inspect the meat, as they had had in some districts.—*Meat Trades Journal.*

THE EXPORT OF HORSES.

A debate has been held at the Guildhouse, Eccleston Square, S.W., on the findings of the Departmental Committee on the export of horses, and among those present were two members of that Committee. Miss A. M. F. Cole, of the R.S.P.C.A., criticised the procedure before the Committee. Miss Ward said the witnesses who were in favour of the suppression of the traffic were bullied. Mr. St. Aubyn Harney, M.P., who was a member of the Committee, said that one result of their investigation was that no better regulations than those existing for the conduct of the trade could be suggested and that it showed that those regulations were being effectively enforced. The

suggestion that for four months everybody concerned all over Europe was keeping up a theatrical display of unanimity to deceive the members of a British Parliamentary Committee was puerile nonsense. Lady Emmott said that the evidence had shown that humane conditions were aimed at in the regulations and no one had suggested that the officials who had to enforce them were not doing their duty. Captain Gee, V.C., was present but did not speak. A resolution was carried favouring the export of the carcases of horses only.

Tuberculous Animals.

At Luton Health Committee a letter was read from a local butcher, stating that recently animals found at the market suffering from tuberculosis have been brought to his slaughterhouse and killed, and asking the Council to make some arrangement by using a building belonging to them for the purpose, as it is detrimental to a butcher to allow his building to be so used.

The Sanitary Inspector reported upon the matter, and suggested that a building be provided near the refuse destructor, where all diseased or unsound food could be taken for examination and detention pending final disposal, and where instruments, clothing and vehicles could be sterilised.

The Chairman of the Committee and the Sewage Committee, with the Borough Engineer and Sanitary Inspector, were asked to confer upon the matter, and report to the next meeting.

"In the Market on Monday," says *The Meat Trades Journal* of December 23rd, "there were on offer over 25,000 Dutch pigs; they met a ready sale at good prices. Feeders in Holland have studied the wants of the retail trader, and cater for them perfectly. Our own people don't or won't."

Voltaire and Veterinary Science.

Dr. J. D. Rolleston, the President of the Section of the History of Medicine of the Royal Society of Medicine, in a paper entitled "Voltaire and Medicine," published in the Society's *Proceedings*, for December, says:

"Voltaire's interest in veterinary science is shown by his correspondence with Bourgelat, Director-General of the Royal Veterinary School, to whom on one occasion he sent the bladder of one of his oxen in which he had found numerous stones (October 26, 1771). In a subsequent letter to Bourgelat, dated March 18, 1775, he writes:—

'I am surprised to find that before you cattle were the only concern of butchers and that horses had only a blacksmith as their Hippocrates. Real help is wanting in the best administered countries. You have put an end to this disgraceful and dangerous state of affairs. . . . I should like a search to be made for remedies for the contagious diseases of our animals when they are in good health for use when they are ill. A dozen different remedies could then be tried on a hundred oxen attacked, and one might reasonably hope that some of the remedies would succeed. There is at the present time a contagious disease in Savoy, about a league from me . . . . My method of protection is to have no communication with the plague-stricken, to keep my animals scrupulously clean, in well-ventilated stables, and to give them wholesome food.'

"Voltaire's precautions against epizootics in his district are also illustrated in a letter recently brought to light by Vézinet,* in which he says:—

'The preservation of cattle being of the greatest importance in our unhappy country, I sent a message to Fretter, one of the butchers in Ferney, that if he did not bring a certificate for the three oxen he bought about a fortnight ago I would expel him from Ferney. I had the same message sent to Abraham Meunier, who appears to be a very doubtful and dangerous character, capable of infecting the whole country in order to gain ten sous.'"

R.C.V.S. Obituary.

McClean, John F., L.R.C.P., London Fever Hospital, Liverpool Road, N.1. Graduated London, 22nd December, 1887. Died about the 21st December, 1925.

Sheppard, Mervyn Wellesley, Sheppard Vale, P.O. Tweespruit, South Africa. Graduated Dublin, 19th July, 1921. Date of death uncertain, but it was in November or December.

Bull, Richard Page, Deddington, Oxfordshire. Graduated London, 1st April, 1878. Died 8th December, 1925.

Frank Garnett Memorial Fund.

Twentieth List of Subscriptions.

	£	s.	d.
Amount brought forward from nineteenth list...	428	15	6
Per Midland Counties V.M.A.—			
D. J. Anthony 1 1 0			
H. S. Cockburn 0 10 6			
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	2	2	0
	£430	17	6

Donations should be made payable to the Frank Garnett Memorial Fund, and sent to the Hon. Secretary, 10 Red Lion Square, London, W.C.1.

CORRESPONDENCE.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

The Rebuilding of the Royal Veterinary College.

To the Editor of The Veterinary Record.

Sir,—Like other graduates of the College, I have read with interest of the proposed re-building, as outlined by Sir Merrik Burrell. No doubt any proposal to move the College from Camden Town would not meet with general approval, on historic and other grounds, but there is no gainsaying the fact that now it is in the wrong place, and would be far better off, in every way, it if was situated in rural surroundings, as are many of the Agricultural

* "Théodore Trenchin," by Henry Trenchin, 1906, p. 147.

Colleges. It would then, perhaps, be possible in time for us to have an institution like the one at Copenhagen that Mr. Steele-Bodger describes in his paper, printed in a recent issue of the *Record*. In such surroundings the students could obtain first-hand practical knowledge on all farm animals, and could also be accommodated on the place, and not obliged, as at present, to migrate from one lodging to another, with little or no comfort; this would promote closer intercourse. At the time when the College was built, things were vastly different from what they are now, and with the negligible number of horses now on the London streets and the restricted acreage at Camden Town, it would be well worth while considering a move to "pastures new" before starting to re-build on the old site. Expansion there is limited, but if a country site was chosen this would not be the case. We hear a lot nowadays of co-operation with the medical profession, but very little with the agriculturists, who, after all, are the people to study. There appears to be no reason why we cannot have an institution devoted to Veterinary Science and Agriculture, as exists at Copenhagen. Other institutions have moved with benefit, why not the Royal Veterinary College?—Yours faithfully, J. F. D. TUTT.

1 St. Cross Road, Winchester.
December 21st, 1925.

Humanitarian Societies and the Veterinary Profession.

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—The letters of Mr. Henry Gray and Colonel Rainey regarding the relationship between the veterinary profession and the poor people's clinics for animals should be read attentively by the veterinary practitioners in London and other large towns. There is an opportunity here for the London veterinary surgeon to take up a line of unselfish procedure that might lead to a greater appreciation of the profession by the public. It cannot be denied that there is a certain amount of antagonism between practitioners and the humanitarian societies, which is deplorable. After all, the profession can claim to have prevented more pain and discomfort in the animal world than all the societies put together, for it is the whole concern of our profession to prevent and cure disease, and to attend to injuries suffered by the servants and companions of man. To uphold this claim we should take our part in the treatment of the animals of those least blest with this world's goods.

How can this be carried out? The answer is simple. All we have to do is to copy the example set by the medical profession and the voluntary hospitals. We must sacrifice something now, to bring about a better state of things later on. Let these clinics increase with our wholehearted approval, and let each clinic have its proper veterinary staff of honorary and paid officers. But the paid officials must only expect salaries corresponding to those in vogue in hospitals. In this way there would grow up centres of treatment by experienced men, which would become later on centres of practical teaching, so lacking to-day in our curriculum. But the inauguration of this scheme must come from our side, and the very first thing to do would be to approach the societies interested and to suggest that at present the treatment of the sick animals of the poor is unsatisfactory, and that the profession is quite willing to help in putting the matter on a sound footing. I cannot see why such a scheme should not redound to our credit later on.

Before closing this letter, I should like to draw your attention to a misapprehension regarding the relationship between veterinary colleges and voluntary hospitals. It is very important to realise that the hospitals were founded by charitable persons to treat the sick poor, not to teach, whereas the veterinary colleges were established to teach students and the treatment of the animals of the less wealthy is only a means to an end, not the end itself. We must endeavour to bring about something in the animal world exactly comparable to the great voluntary hospitals with their centuries of honourable and unselfish work among the poor.—Yours truly, BERNARD GORTON.

London, N.W.1.
December 23rd, 1925.

"An Experience Under the Tuberculosis Order."

TO THE EDITOR OF THE VETERINARY RECORD.

Sir,—In the case reported under the above heading in the course of "An interesting case miscellany," in your excellent issue of December 12th, the owner of the cow did not think she had tuberculosis; the Veterinary Inspector thought she might have flukes or cysts in the liver, so the animal was valued and slaughtered under the T.B. Order of 1925. As a result, the owner, I presume, got her full value plus one pound sterling.

Did, or did not, the essayist think the cow was tuberculous? If he did, I should like to ask: (1) Did he attempt to confirm his suspicions by inspection, palpation, percussion and auscultation? (2) Did he examine *per rectum* for the presence of enlarged glands in the abdomen? (3) Did he employ one or other of the many tuberculin tests? and (4) Did he examine the sputum or milk for acid-alcohol-fast bacilli? The article gives one the impression that the veterinary inspector did not think the cow was tuberculous, so why was she dealt with under the Tuberculosis Order? Such an action can result only in bringing discredit upon the profession, and the Order generally.

The inspector suspected the existence of distomiasis, but makes no mention of any attempt to confirm his suspicions by examining the fæces for the presence of flukes or eggs. On what evidence did he base his very accurate diagnosis of cysts in the liver?

I should like to hear the views of others upon this case, as that, I take it, is what the essayist desires.—Yours faithfully, T. D. LLOYD-JONES.

Denbigh.
16th December, 1925.

National Veterinary Medical Association of Great Britain and Ireland.

EDITORIAL OFFICE: 10 Gray's Inn Square, London W.C.1.

All communications relative to the literary side of the Veterinary Record must be addressed to the Assistant Editor, "Veterinary Record," 10 Gray's Inn Square, W.C.1

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